

Serial No.: 10/646,351

In the claims:

Please cancel claim 10 and amend claims 9 and 11 as follows:

1. (Previously Presented) An optical repeater, comprising:

at least four optical amplifiers each supplying optical amplification to an optical signal traveling in a different unidirectional optical fiber that collectively form at least two bi-directional pairs of optical fibers;

a first plurality of pump sources for providing pump energy to a first optical fiber located in a first of the optical fiber pairs and a second optical fiber located in a second of the optical fiber pairs, said first optical fiber and said second optical fiber supporting optical signals traveling in a common direction;

a first combiner arrangement combining the pump energy from the first plurality of pump sources and distributing it to the optical amplifiers supplying amplification to optical signals traveling in the first and the second optical fibers;

a second plurality of pump sources for providing pump energy to a third optical fiber located in said first optical fiber pair and a fourth optical fiber located in said second optical fiber pair, said third optical fiber and said fourth optical fiber supporting optical signals traveling in a common direction that is opposite to that of said first and second optical fibers; and

a second combiner arrangement combining the pump energy from the second plurality of pump sources and distributing it to the optical amplifiers supplying amplification to optical signals traveling in the third and the fourth optical fibers;

a first passive coupling arrangement for conveying excess pump energy that traverses the optical amplifiers in the first and the second optical fibers to the third and the fourth optical fibers at a location upstream from the optical amplifiers supplying amplification to optical signals traversing the third and the fourth optical fibers.

2. (Canceled)

Serial No.: 10/646,351

3. (Previously Presented) The optical repeater of claim 1 further comprising a second passive coupling arrangement for conveying excess pump energy that traverses the optical amplifiers in the third and the fourth optical fibers to the first and the second optical fibers at a location upstream from the optical amplifiers supplying amplification to optical signals traversing the first and the second optical fibers.
4. (Original) The optical repeater of claim 1 wherein said optical amplifiers are rare-earth doped optical amplifiers.
5. (Original) The optical repeater of claim 4 wherein said rare-earth doped optical amplifiers are erbium-doped optical amplifiers.
6. (Original) The optical repeater of claim 1 wherein said first combiner arrangement includes a first combiner and a first plurality of couplers coupling pump energy from said combiner to the first and the second optical fibers.
7. (Original) The optical repeater of claim 6 wherein said second combiner arrangement includes a second combiner and a second plurality of couplers coupling pump energy from said second combiner to the third and the fourth optical fibers.
8. (Original) The optical repeater of claim 7 wherein said first and second combiners are 2x2 combiners.
9. (Currently Amended) An optical repeater, comprising:
 - at least four optical amplifiers each supplying optical amplification to an optical signal traveling in a different unidirectional optical fiber that collectively form at least two bi-directional pairs of optical fibers;
 - a first plurality of pump sources for providing pump energy to a first optical fiber located in a first of the optical fiber pairs and a second optical fiber located in a second of the optical fiber pairs, said first optical fiber and said second optical fiber supporting optical signals traveling in a common direction;

Serial No.: 10/646,351

a first combiner arrangement combining the pump energy from the first plurality of pump sources and distributing substantially all of the combined pump energy from the first plurality of pump sources to the optical amplifiers supplying amplification to optical signals traveling in the first and the second optical fibers;

a second plurality of pump sources for providing pump energy to a third optical fiber located in said first optical fiber pair and a fourth optical fiber located in said second optical fiber pair, said third optical fiber and said fourth optical fiber supporting optical signals traveling in a common direction that is opposite to that of said first and second optical fibers; and

a second combiner arrangement combining the pump energy from the second plurality of pump sources and distributing substantially all of the pump energy from the second plurality of pump sources to the optical amplifiers supplying amplification to optical signals traveling in the third and the fourth optical fibers; and

a first passive coupling arrangement for conveying excess pump energy that traverses the optical amplifiers in the first and the second optical fibers to the third and the fourth optical fibers at a location upstream from the optical amplifiers supplying amplification to optical signals traversing the third and the fourth optical fibers.

10. (Canceled)

11. (Currently Amended) The optical repeater of claim 10 further comprising a second passive coupling arrangement for conveying excess pump energy that traverses the optical amplifiers in the third and the fourth optical fibers to the first and the second optical fibers at a location upstream from the optical amplifiers supplying amplification to optical signals traversing the first and the second optical fibers.

12. (Previously Presented) The optical repeater of claim 9 wherein said optical amplifiers are rare-earth doped optical amplifiers.

13. (Previously Presented) The optical repeater of claim 12 wherein said rare-earth doped optical amplifiers are erbium-doped optical amplifiers.

Serial No.: 10/646,351

14. (Previously Presented) The optical repeater of claim 9 wherein said first combiner arrangement includes a first combiner and a first plurality of couplers coupling pump energy from said combiner to the first and the second optical fibers.

15. (Previously Presented) The optical repeater of claim 14 wherein said second combiner arrangement includes a second combiner and a second plurality of couplers coupling pump energy from said second combiner to the third and the fourth optical fibers.

16. (Previously Presented) The optical repeater of claim 15 wherein said first and second combiners are 2x2 combiners.